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the interests of anthropology on the relative proportions and geographical distribution of blondes and brunettes in the German empire. Before the Anthropological congress at Carlsruhe, Professor Virchow gave an account of the results of these observations, illustrating his remarks by diagrams. An account of the study, together with the illustrations, will appear in full in Germany.

The study included all children of school age throughout Germany. Those only were classed as blondes who had light hair, blue eyes, and a fair complexion. The brunettes included those who had black hair and eyes, though the complexion might be more or less fair. All others were classed as mixed, including those with gray eyes. It is to be regretted that the same method was not followed in Belgium, where similar studies had been in progress, so that a direct comparison could be made.

Thirty-two per cent, or almost a third of the German youth, are blondes; 14 per cent are brunettes; while all the rest, 54 per cent, must be classed as mixed. This mixture is not a homogeneous one, but includes all intermediate varieties. One class of the German population forms a decided exception to these averages, viz., the Jews. Jewish children show only 11 per cent of blondes, but 42 per cent of brunettes. Their greater purity of race is shown by the small ratio of the mixed class amongst them. The blond type is particularly prevalent in Oldenburg and the neighboring more northerly communities: it is rarest in eastern Bavaria and in Alsace. A canton (Wildeshausen) in Oldenburg has 56 per cent of its population blondes, while Roding, a town in the second group, has only 9 per cent, a difference of 47 per cent. The former has only 4 brunettes to each 100 inhabitants, while a southern town in Alsace has as many as 31 to 100. The distribution of the blond type is much wider than that of the brunette type, which is only a secondary type. A canton in Wurtemberg shows the largest ratio of the mixed class, 60 per cent, while Pomerania shows the smallest, 40 per cent. The same contrast between the north and the south is shown in Belgium and in Switzerland. In southern Austria the brunette type is especially marked, but here the mixture with the Slavic people adds a complication.

What is the origin of this dark race amongst the Germans? Ancient writers describe them as having fair hair and eyes. One can assume that the immigrating races were of two types,—blondes and brunettes. But this would not account for the present geographical distribution, or perhaps a gradual transformation has taken place: this is improbable, because the climatic and other differ-

ences between north and south Germany are not sufficient to bring about such marked differences. The true explanation is suggested by the large proportion of the mixed class. The Germans were blondes, and spread to the east and south as such; but in Switzerland and Alsace they encountered a dark race, which was not expelled, but forced a mixture with the conquering race. The gray eyes are an indication of this great mixture of types, and not a mark of a third type. The questions regarding the brunette type must be resolved into a series of secondary problems connected with the general development of all the types. It must also be remembered that the characteristics by which the Germans have been described are not peculiar to them, but are common to other anthropologically different nations, of which the Finns are an example. Professor Virchow expressed the opinion that a comparative study of this question in different European nations would be of great importance.

#### DEFORMITIES OF BONES AMONG THE ANCIENT PERUVIANS.

NEARLY fifty years ago Dr. v. Tschudi, in the disinterment of a number of Indian graves in the vicinity of Lima, found one containing the parts of three skeletons, in which the bones showed peculiar deformities, due to disease. The graves were near the famed temple of Pachacamac; and from the position, as well as the associated objects, Tschudi determined them to belong to one of the earlier epochs of the Incas, in the thirteenth century of the Christian era. From the accounts given by the native Indians, Tschudi learned of other graves, farther south, in which numerous skeletons with similar deformities had been found, and from which he concluded that persons thus afflicted had been buried together, as has been more recently done with the bodies of those dying from cholera.

These specimens were studied a few years later by Zschokke, who found the deformations so different from those produced by other known causes, that he pronounced the disease a new one. Very recently, however, the bones have come under the examination of Professor Virchow,<sup>1</sup> who has determined the cause to have been the affection described under the name of 'multiple exostosis.' This disease is one of the rarest known, and has only been recently studied and described. It is due to abnormal development, and appears most frequently near the ends of the long bones, resulting in remarkable growths, sometimes as

<sup>1</sup> Ueber krankhaft veränderte Knochen alter Peruaner, von Rud. Virchow, *Sitzungsberichte d. k. preussischen akad. d. Wissenschaften*, 1885, p. 1129.

spongy masses, at other times as long, firm, ivory processes of the most varied shapes, several inches or more in length. The disease is more or less hereditary, nevertheless its apparent frequency among the ancient Incas is interesting.

Of more especial interest, however, is the relation which Virchow surmises to exist between this multiple exostosis and the bony growths found with remarkable frequency in the ear-canal of the ancient Peruvian crania. Nearly two scores of specimens have been described, in which either one or both auditory canals were more or less filled with bony growths, usually near the middle. As in nearly all these cases the peculiar flattening or elongation of the occipital region occurs to a greater or less extent, some have assigned this as the cause. Others have thought that the custom, so common among the Incas and other non-civilized races, of wearing rings or large disks of metal in the fleshy ear, had produced the affection. To both of these views Virchow objects. Not only have cases been observed among the North American Indians where there is no cranial deformation, but in the Incas themselves deformed skulls without, and undeformed skulls with, the exostosis, are known. The very common custom among many races of the present day, of wearing foreign substances in the ears, is not known to produce this result. The author believes them to be due to abnormal ossification, of a nature either closely related to, or identical with, that in other parts of the skeleton. Why this disease should have occurred with such greater frequency among this race we do not know, and we can only speculate upon the extent that it affected the audition. The effects of the disease must have been produced in childhood, probably early. In many cases the auditory canal is entirely closed on one or both sides, in others much narrowed. That it must have diminished the power of hearing, is evident. To what extent absolute deafness was caused, one cannot say.

#### LARGE VERSUS SMALL TELESCOPES.

THE critical observer can hardly fail to have noticed, during the past few years, the setting-in of a slight reaction against the monster telescopes and their capacity for advanced astronomical work. Perhaps this is not better defined at present than a tendency to reaction merely; and it seems to have had its origin mainly with a few possessors of medium-sized instruments, who, perhaps, had failed in their efforts to procure larger ones. Any astronomer who has had experience in the adaptation of different kinds of observational work to the varying capacity of different

instruments knows very well that there is work enough of a sort which the largest telescopes only are fitted to perform in the best manner; and he also recognizes the fact that in other times of research, which are happily by no means exhausted, the small telescopes have many advantages over the large ones. But these relate rather to the mechanical than to the optical parts of the telescope.

It is not too much to say that the methods peculiar to the opticians of the present day have advanced the construction of the telescope to a degree of perfection which far surpasses the apparent possibilities of observational astronomy in other directions. If the optician gives the astronomer a practically perfect instrument, and the latter finds its performance disappointing, one or other of three things will be true: either he has set it up in a bad atmosphere, or the work to which he has put the instrument is ill adapted to its size, or (it is a good thing for every ambitious fledgling to institute this modest though often disastrous inquiry) the trouble resides in the cerebro-optical apparatus just outside the eye-piece. The first of these conditions appears in a fair way to be partially removed in the early future by the building of mountain observatories in regions where great steadiness of the upper atmosphere is insured; the second gradually removes itself with every new experience; while the third constitutes a very serious obstacle to the progress of the sciences; for what can the conscientious astronomer do with the work of a bad observer? He hesitates to mingle bad observations with good ones, for he cannot tell how much the accuracy of the final result may be impaired; nor does he like to reject the bad ones, because his work is then open to the charge of incompleteness; and, besides, the bad observer makes it an invariable rule to omit all data which might help the theoretical astronomer to find out just how bad his observations are.

Until lately, those who have been discussing in astronomical journals the relative merits of large and of small telescopes have quite overlooked the astonishing variation in the eye-power of different observers. As a general rule, — and for a very obvious reason, — the large telescopes come into the possession of the best observers, while the weaker eyes and heads must continue their use of the smaller instruments. Notwithstanding this natural result of evolution, the lesser telescope sometimes seems to have the greater advantage. While fully realizing the superior power of the great telescope, the observer using it has learned to be very cautious in pronouncing upon what he sees: but the imaginative amateur is bound by no such restrictions; he is free to conceive what